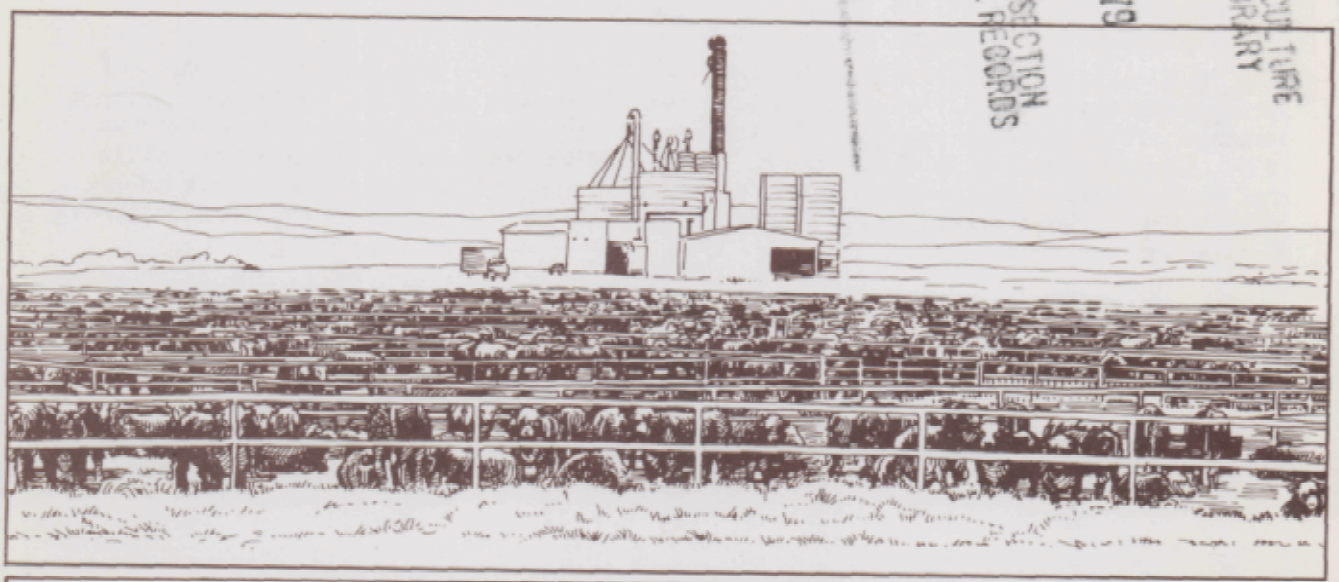
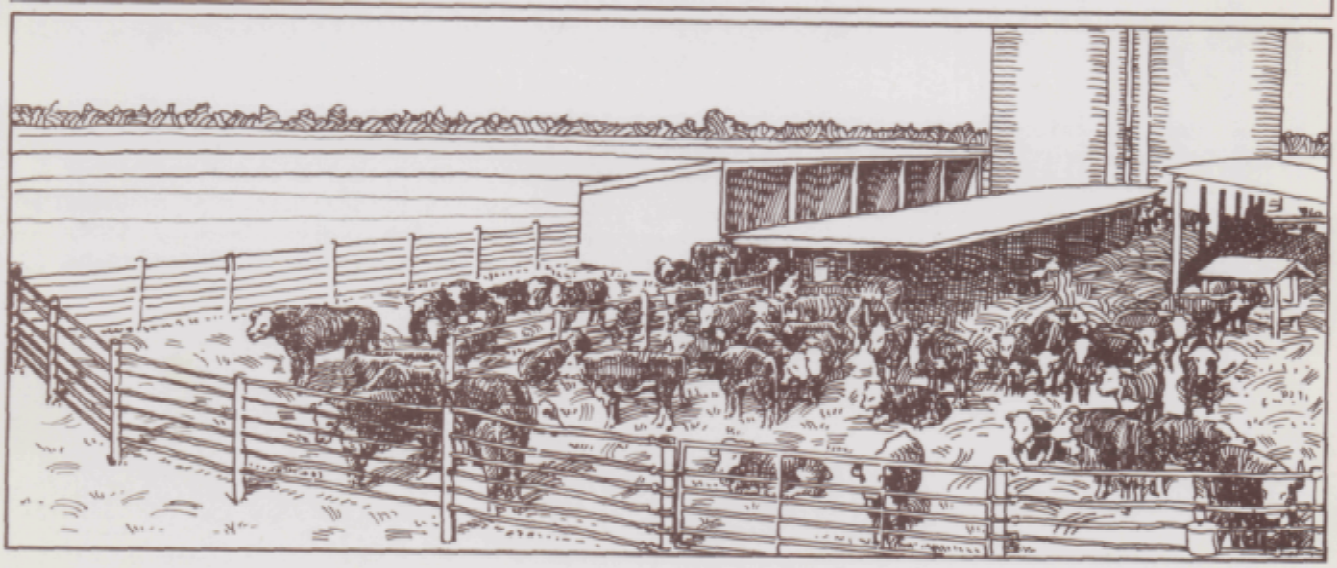
U.S. Fed-Beef Production Costs, 1976-77, and Industry Structure

C. Kerry Gee, Roy N. Van Arsdall, and Ronald A. Gustafson





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ABSTRACT

U.S. cattle-feeding businesses operated at a loss in 1976 and 1977. Fed-beef production costs in 1977 averaged $43.55 per 100 pounds marketed, while the national average price feedlots received per 100 pounds for slaughter steers and heifers was $39. Farmer feedlots in the Midwest, those feeding less than 1,000 head of cattle, had higher production costs and lost more money than did commercial feedlots in the West. The largest direct costs for both types of feedlot were for replacement feeder cattle and for feed.

Keywords: Fed beef, Production costs, Feedlots, Farmers feedlots, Commercial feedlots.

PREFACE

Data in this report are from a comprehensive project by the Economics, Statistics, and Cooperatives Service (ESCS), U.S. Department of Agriculture, to identify structural characteristics, operating practices, production, costs, and returns for major meat animal industries in the United States. This research is the result of a cooperative effort by several ESCS personnel, including Henry Gilliam, Calvin Boykin, Jack Trierweiler, and Jim Nix. All data collection was made by the Statistical Reporting Service (now a part of ESCS).

Washington, D.C. 20250 June 1979

CONTENTS

SUMMARY

U.S. cattle-feeding businesses operated at a loss in 1976 and 1977. Fed-beef production costs averaged $45.06 and $43.55 per 100 pounds marketed, respectively, for the 2 years. National average prices feedlots received per 100 pounds for slaughter steers and heifers were $38 and $39, respectively, for the 2 years.

Farmer feedlots in the Midwest, those feeding less than 1,000 head of cattle, had higher production costs and lost more money than did commercial feedlots in the West. Production costs per 100 pounds marketed by farmer feedlots were $47.99 in 1976 and $48.99 in 1977. Commercial feedlot costs were $43.50 and $40.76 for 1976 and 1977, respectively. Cash costs for both regions were similar; however, noncash costs were considerably higher for farmer-feeders.

Total direct costs in 1977 for such items as replacement feeder cattle, feed, veterinary services, marketing, and labor were similar for both farmer and commercial fed-beef producers. Major differences occurred, however, in depreciation, interest, taxes, insurance, and management charges. Those costs were $5.81 per 100 pounds marketed for farmer feedlots and 77 cents for commercial feedlots.

The largest direct costs in 1977 for both types of feedlot were for replacement feeder cattle and for feed. Those items together accounted for 68 and 89 percent of direct costs for farmer and commercial feedlots, respectively. Feeder-cattle costs for farmer feedlots were $18.40 per 100 pounds of fed-beef marketed, and feed costs were $15.56 per 100 pounds marketed. Feeder-cattle costs for commercial feedlots were $22.16 per 100 pounds of fed-beef marketed, and feed costs were $14.40. Other direct costs, such as transportation, marketing, gas, oil, and labor, were smaller for commercial feedlots than for farmer feedlots.

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INTRODUCTION

About 132,000 feedlots sold 24.9 million head of fed beef in 1977 for $10 billion, almost 50 percent of the $20.7 billion in gross income from all U.S. cattle and calf sales that year. The average cattle-feeding business, however, operated at a loss in 1976 and 1977. Fed-beef production costs averaged $45.06 and $43.55 per 100 pounds marketed, respectively, for the 2 years. National average prices feedlots received per 100 pounds for slaughter steers and heifers were $38 and $39, respectively, for the 2 years.

This report identifies and quantifies input requirements, costs, and returns in U.S. fed-beef production. It also describes structural characteristics of the industry. These data provide a base for evaluating changes in costs and returns, projecting trends in fed-beef production, and determining representative fed-beef enterprises by region, size of business, and system of production.

Sources and Limitations of Data

Much of the data for this report are for 1975, and are based on a U.S. Department of Agriculture (USDA) survey taken in the spring of 1976. The sample included 171 commercial feedlots and 137 farmer feedlots, with information obtained through personal interviews. Supplementary information for 1976-77 was obtained from secondary sources. In each case, the latest available data were used.

The cattle industry was recovering from the effects of a turn in the cattle cycle during the period 1975-77. Prices were just beginning to recover from their lows. Fed-beef businesses were working their way out of a severe loss situation that had caused many to stop feeding or make large reductions in inventories. Extremely high feed prices forced producers to change traditional practices related to purchase and market weights of cattle and feeding programs. The field survey and subsequent data collection reflect some of these conditions and the adjustments back to more normal fed-beef production practices which occurred during 1976-77.

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Definitions

Commercial feedlots: Feedlots with 1,000-head or more one-time capacity.

Custom cattle feeding: Feeding cattle owned by individuals other than the feedlot owners.

Farmer feedlots: Feedlots with less than 1,000-head, one-time capacity.

Fed beef: Cattle that have been fed on a fattening ration for the slaughter market.

Feedlot capacity: Maximum cattle numbers a feedlot can hold at one time.

Horizontal integration: Ownership of two or more separate feedlots.

Vertical integration: Ownership of more than one stage in the production of fed beef, such as feeding, slaughtering, and retailing.

FED-BEEF PRODUCTION

Cattle-feeding statistics are reported by USDA for 23 States (fig. 1). The remaining States have some cattle on feed, but the numbers are not large enough to warrant collection of data other than January 1 inventories. The excluded States account for only 5 percent of total U.S. fed-cattle numbers.

Fed-beef production continues to shift towards larger but fewer feedlots. The number of feedlots in the 23 major cattle-feeding States between 1965 and 1977 declined from 215,422 to 131,904 lots, while the number of fed cattle marketed increased from 17.9 million to 24.8 million head (table 1). Record high marketings of 26.8 million head occurred in 1972 before declining in the mid-seventies due to large losses. Marketings began increasing again in 1976.

Location of Production

Geographically, the cattle-feeding States are divided into two groups: those in the Western 14 States and those in the Midwestern 9 States. 1/ Nearly three-fourths of all feedlots are in the Midwest, but these account for only 25 percent of fed-beef marketings (table 2). These feedlots are generally small, with less than 1,000-head capacity. The Western States, with relatively few but extremely large feedlots, market 75 percent of the fed beef.

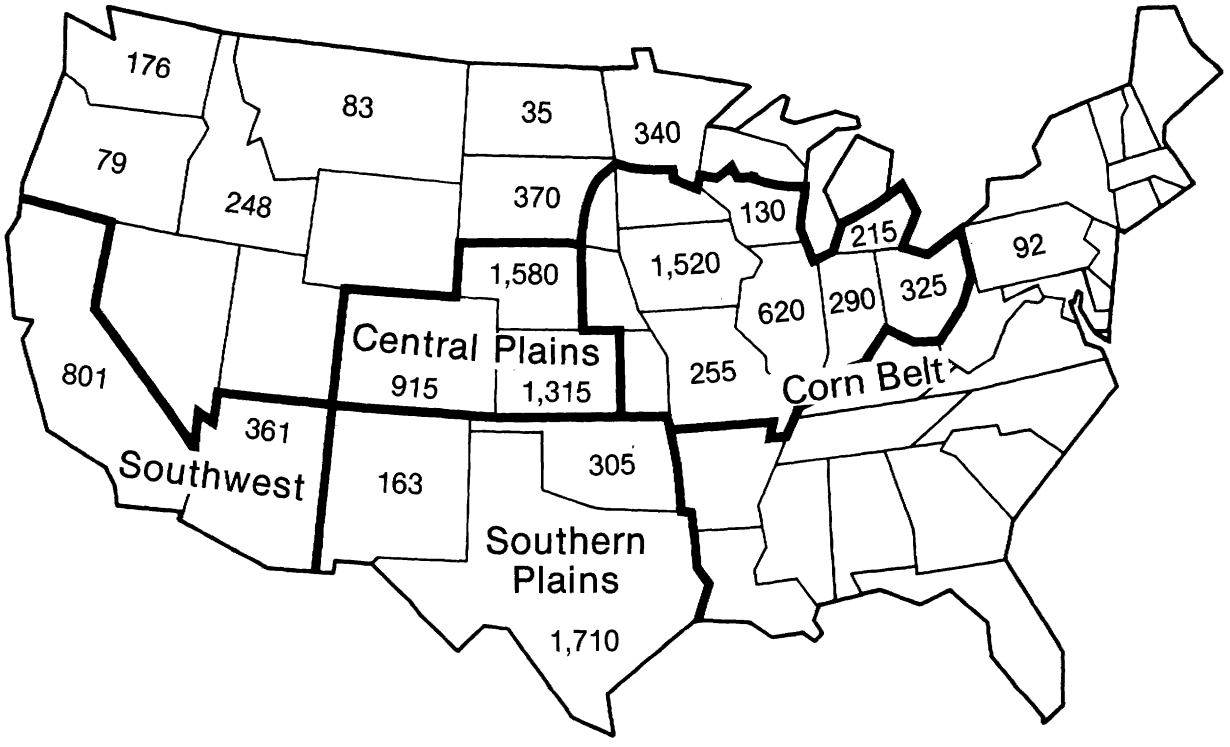
There was little change in general location of feedlots during 1965-77. There was a significant geographical shift in production, however, with the West advancing from 59 to 75 percent of total production. The construction of many large western feedlots accounted for most of this shift, although the number of feedlots in both regions declined.

Individual States experienced important changes in fed-cattle marketings (table 2). Ten Western States increased marketings since 1965. The 1977 marketings in Texas, Kansas, and Oklahoma were 386 percent, 384 percent, and 244 percent, respectively, of

1/ Western States include Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, and Washington. Midwestern States include Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, and Wisconsin.

Figure 1.

Geographical Distribution of U.S. Fed-Beef Production, 1977



Numbers in States indicate cattle on feed (1,000 head) January 1, 1977, in the 23 major cattle-feeding States.

USDA

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Table 1--Feedlots and fed-beef marketings, 23 major cattle-feeding States, 1965-77

Year	Feedlots	Fed-beef marketings	Year	Feedlots	Fed-beef marketings
	Number	1,000 head		Number	1,000 head
1965	215,422	17,926	1972	154,409	26,845
1966	208,510	19,534	1973	146,220	25,304
1967	201,173	20,942	1974	137,737	23,330
1968	195,247	22,662	1975	137,029	20,504
1969	185,527	23,860	1976	132,535	24,170
1970	183,517	24,933	1977	131,904	24,853
1971	65,237	25,281			

Table 2--Feedlots and fed-beef marketings, by region and State

Region and State	Feedlots			Fed-beef marketings		
	1965	1977	1977 as a proportion of 1965	1965	1977	1977 as a proportion of 1965
	--- Number ---		Percent	--- Number ---		Percent
Midwest:						
Illinois	28,500	14,000	49	1,310	940	72
Indiana	16,000	10,500	66	428	352	82
Iowa	47,000	33,000	70	3,293	2,862	87
Michigan	2,000	1,550	77	219	277	126
Minnesota	21,500	11,200	52	684	758	111
Missouri	17,500	8,000	46	660	323	49
Ohio	12,000	7,800	65	456	403	88
Pennsylvania	6,004	6,000	100	116	115	99
Wisconsin	6,700	6,500	97	194	179	92
9-State total	157,204	98,550	63	7,360	6,209	84
West:						
Arizona	102	41	40	650	646	99
California	603	137	23	2,282	1,612	71
Colorado	1,319	506	38	1,144	2,301	201
Idaho	800	544	68	271	438	162
Kansas	13,500	6,000	44	857	3,287	384
Montana	600	101	17	142	134	94
Nebraska	23,000	14,360	62	2,438	3,785	155
New Mexico	135	40	30	177	294	166
North Dakota	3,100	898	29	175	63	36
Oklahoma	1,753	360	21	300	732	244
Oregon	551	500	91	167	172	103
South Dakota	10,400	8,600	83	561	572	102
Texas	1,745	1,200	69	1,094	4,227	386
Washington	610	92	15	308	389	126
14-State total	58,218	33,379	57	10,566	18,652	177
23-State total	215,422	131,929	61	17,926	24,861	139

1965 levels, while the other States had smaller increases. California, Montana, North Dakota, and Arizona showed reductions in marketings during the 1965-77 period. All Midwestern States had reductions in marketings except Michigan and Minnesota which had slight increases.

Size of Enterprise

U.S. cattle feedlots vary in capacity from less than 100 head to more than 100,000 head, with a small number of large feedlots dominating fed-beef production. Only 1 to 2 percent of the feedlots in the 23 States have capacities of 1,000 head or more, yet these businesses marketed 68 percent of the total 1977 fed-beef production.

Growth in fed-cattle marketings continued throughout the 1965-77 period (table 3). There was a 39-percent reduction in feedlots of less than 1,000-head capacity. Feedlots with a capacity of 1,000 to 1,999 head rose above 1965 levels for a few years, but were down 3 percent by 1977. Those with a capacity of 2,000 to 3,999 head held relatively stable throughout most of the period, but were down 7 percent by 1977. Considerable growth, however, occurred in feedlots at and above 8,000-head capacity. Increased numbers among these sizes in 1977 ranged from 167 percent to 762 percent above 1965 levels. Fed-beef marketings increased in all groups except that with under 1,000-head capacity (table 3).

Large commercial feedlots predominate marketings in the Western States (table 4). Production of vast quantities of grain and roughage resulting from irrigation development in this otherwise arid region was an important factor in commercial feedlot development. A ready supply of feeder cattle and an expanding demand for fed beef also contributed to the growth. These businesses were found profitable and efficient in the production of fed beef, which further stimulated an expansion in numbers. A marketing system developed that catered to the movement of large numbers of cattle in individual transactions. Farmer feedlots comprise nearly 96 percent of the feedlots in the West, primarily in South Dakota, Nebraska, and Kansas (89 percent of Western States' farmer feedlots), but they contribute only 14 percent of the area's total marketings.

Midwestern States, in contrast to the dominance of large commercial feedlots in the West, have mostly small-farm-size fed-beef enterprises. These fed-beef enterprises frequently are supplementary to the total business, with their size dependent on home-grown feeds. In some instances, small beef-breeding herds on farms provide the feeder calves that are fattened. Crop sales usually are the principal source of income. The importance of different sizes of farmer-feedlot beef enterprises in the Midwest is shown in table 5.

Fed-Beef Regions

Four cattle-feeding regions are identified for this study because of size and location characteristics of U.S. fed-beef production (fig. 1). These regions are:

Corn Belt farmer feedlots: entire States of Ohio, Indiana, Illinois, Iowa, and Missouri, and parts of Michigan, Wisconsin, Minnesota, South Dakota, Nebraska, and Kansas.

Central Plains commercial feedlots: Colorado and much of Nebraska and Kansas.

Southern Plains commercial feedlots: Oklahoma, Texas, and New Mexico.

Southwestern commercial feedlots: California and Arizona.

Commercial feedlots--those with 1,000-head or more capacity--are generally specialized businesses, marketing nearly 70 percent of U.S. fed beef. Farmer feedlots with less than 1,000-head capacity are usually part of a diversified farming operation.

Some commercial feedlots are located in the Corn Belt region, but they contribute less than 20 percent to the region's marketings. Likewise, farmer feedlots in commercial feedlot regions contribute less than 16 percent to marketings. Feedlots in the commercial feeding regions are similar in facilities and general operating practices. Differences in climate, feeds, numbers of cattle fed, and costs provide the basis for region identification.

Table 3--Indexes of feedlots and fed-beef marketings, by feedlot capacity, 23 cattle-feeding States

Item	Feedlot capacity (head)								
	Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over	1,000 and over	All sizes
	1965=100								
Feedlots:									
1966	97	106	106	118	100	121	100	108	97
1967	93	107	111	122	105	130	150	111	93
1968	90	105	112	121	129	177	200	114	91
1969	88	87	116	133	142	235	388	122	86
1970	78	114	112	132	157	249	525	128	82
1971	76	116	125	135	155	265	593	131	77
1972	71	106	105	124	161	286	738	120	72
1973	67	103	110	117	165	319	863	121	68
1974	64	89	113	108	161	344	913	114	65
1975	61	79	104	111	155	347	762	106	63
1976	62	77	98	110	155	349	750	104	62
1977	61	97	93	99	167	321	762	111	61
Fed-beef marketings:									
1966	105	109	118	114	100	123	103	114	109
1967	111	112	118	123	111	136	136	125	117
1968	118	113	121	122	127	161	175	138	127
1969	110	115	112	126	140	205	314	162	133
1970	109	116	117	131	163	211	404	180	139
1971	102	122	122	140	162	257	432	194	141
1972	99	125	116	147	170	276	618	218	150
1973	87	110	110	122	166	272	695	216	131
1974	80	95	91	104	149	275	641	198	130
1975	80	95	91	104	149	277	470	174	114
1976	77	91	99	120	192	311	629	214	135
1977	77	113	102	111	211	319	646	223	139

Table 4--Percentage distribution of feedlots and fed-beef marketings, by feedlot capacity, 23 States, 1977

Feedlot capacity (head)	Feedlots			Fed-beef marketings		
	Western 14 States	Midwestern 9 States	All 23 States	Western 14 States	Midwestern 9 States	All 23 States
	Percent					
Under 1,000	95.9	99.4	98.5	14.4	84.6	31.8
1,000-1,999	1.3	.4	.6	3.9	7.3	4.7
2,000-3,999	.9	.1	.3	5.0	4.1	4.8
4,000-7,999	.6	1/	.2	8.1	2.3	6.7
8,000-15,999	.7	1/	.2	18.6	1.7	14.4
16,000-31,999	.4	0	.1	26.0	0	19.5
32,000 and over	.2	0	.1	24.0	0	18.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

1/ Less than 0.1 percent when rounded to whole numbers.

Table 5--Percentage distribution of farmer feedlots and fed-beef marketings, by feedlot marketings, nine Midwestern States, 1974

Feedlot marketings (head)	Farm feedlots	Fed-beef marketings
	Percent	
Under 100	86.4	30.1
100-199	6.9	15.1
200-499	5.0	23.7
500-999	1.2	13.3
1,000 and over	.5	17.8
Total	100.0	100.0

Source: 1974 Census of Agriculture.

COST OF PRODUCTION

Cost-of-production and revenue estimates were made with the USDA Firm Enterprise Data System (FEDS) which consists of a computerized service for budget construction, aggregation to regional and national estimates, and periodic updating of costs and returns.

Enterprise Budgeting Procedures

Fed-beef production costs are estimated for farmer feedlots in the Corn Belt and large commercial feedlots in the Western States; these feedlots account for over 90 percent of U.S. fed-beef marketings. The costs are combined for a national average

cost estimate. Excluded from the calculations are farmer feedlots in the Western States and commercial feedlots in the Corn Belt region for which insufficient budget data were collected due to sampling procedures.

The survey of fed-beef businesses included a complete description of facilities and equipment, rates of major input use, and output of slaughter beef. Data from the survey provide the basis for constructing feedlot investment and in use rates for machinery, equipment, and facilities. Labor requirements also were derived from this source. All facility and equipment costs are set on a 1976 replacement cost basis and adjusted to reflect actual past investments. Enterprise budgets for 1976 and 1977 employ the same requirements per head for labor, machinery, and equipment use as reported in the survey. Data on feed consumption, rate of gain, turnover rates in the feedlot, and fed-beef marketed, which varies from year to year, are from secondary sources that reflect 1976 and 1977 production. Prices of feed and cattle are averages reported by USDA for time periods in which purchases and sales took place. Costs of minor items such as marketing, veterinary-medical, and miscellaneous expenses are from the 1975 survey and are indexed to 1976 and 1977 using appropriate indexes.

The enterprise budget estimates assume that inputs are valued at their market price. Therefore, feed produced on the farm, family labor, and management are charged at going market rates. Hay fed by Corn Belt farmer feedlots is valued at cost of production.

Period Covered

The production period varies between large commercial feedlot and small farmer feedlot enterprise budgets. Purchases of inputs and marketings in the former occur on a nearly continuous basis, so a production year is defined as the calendar year. Many farmer feedlots feed only one group of cattle, purchased in the fall and marketed the following spring or summer. The production year is identified as the year in which marketing occurs--many cattle were purchased and placed on feed during the fall of the previous year.

Feeder Cattle

Average weight of feeder animals entering commercial feedlots in 1976 and 1977 are shown in table 6. Average steer weights within each region were similar for the 2 years, while heifer weights exhibited some variation.

Southwestern feedlots fed practically all steers, which is their usual practice. Slightly more steers than heifers were fed in the other commercial feeding regions.

Data are not available for weights of cattle placed on feed in farmer feedlots. Farm records are the base used to set average steer and heifer weights of 533 pounds and 497 pounds, respectively, for both 1976 and 1977. This is a composite weight of both calf and yearling feeding programs.

Feed

Feeds are valued at market prices reported by USDA for each region and for months when feeds fed in 1976 and 1977 were normally purchased. One exception is hay fed in farm feedlots which is valued at cost of production. Feeds such as grain and hay were purchased during the preceding fall as well as during the budget year.

Ration composition identified for each region is assumed to be the same for both 1976 and 1977 (table 7). Grain comprises the bulk of most fed-beef rations, with dry- or high-moisture corn as the principal source. Milo and wheat are used to a lesser extent where justified by supplies and relative prices. Barley also is used in the Far West. Supplements to provide needed protein usually are cottonseed meal, soybean

Table 6--Percentage of steers and average weight of feeder cattle entering commercial feedlots, by region

Cattle and year	Central Plains	Southern Plains	Southwest	Average
		Percent		
Feeder steers as a proportion of total marketings:				
1976	57	57	93	64
1977	61	63	91	67
		Pounds		
Feeder steers:				
1976	693	630	641	662
1977	690	635	595	654
Feeder heifers:				
1976	591	481	653	565
1977	587	510	637	570

meal, and urea. Byproduct feeds, such as dried beet pulp, beet molasses, and hominy feed, also are used where supplies exist. Roughages generally are corn silage and alfalfa hay, with a limited use of cottonseed hulls or similar byproducts.

Feed efficiency in fed-beef production depends upon ration composition, weight and sex of cattle, and length of the feeding period. Feed conversion is measured on an actual weight basis in this report. Feed conversion for Corn Belt farmer feedlots is estimated for 1976 and 1977 at 12.5 pounds of feed per pound of gain. Ration composition and sex and weight of cattle fed in commercial feedlots may change over time; thus, values assumed for 1976 and 1977 are 9.8 and 9.6 pounds, respectively. Pounds of feed per pound of gain range from 8 to 10.5 pounds, depending on ration fed.

Rations with high roughage content usually result in more pounds of feed per pound of production. This relationship can be seen by comparing ration composition in table 7 with the above mentioned conversion rates. Weight and sex of cattle also influence feed conversion.

A measure of relative feeding costs over time and among regions is cost per ton of total ration. Cost per ton was highest in the Southwest, mostly because of higher transportation costs for feed stemming from shipping large quantities into this grain deficient area. Cost per ton for 1977 was lower in all areas due to a general drop in feed prices nationwide.

The low cost per ton for Corn Belt farmer feedlots is attributed to producers using large quantities (over 50 percent of the total ration) by weight of the less expensive silage and hay and to the pricing of hay at cost of production. Similarly, the higher cost per ton of ration in the Southern Plains and Southwest reflect the higher concentrate rations fed.

Table 7--Ration composition and cost for fed-beef production, by region

Item 1/	Corn Belt	Central Plains	Southern Plains	Southwest
		Percent		
Concentrates as a percentage of total ration, 1976-77	48	72	82	83
		Dollars		
Cost per ton of total ration:				
1976	54.75	80.66	88.15	104.71
1977	50.99	71.01	78.76	91.74

1/ Rations are on an actual-weight basis.

Fed-Beef Produced

The quantity of fed-beef marketed from a given input of feeder animals depends upon pounds of gain per day and days on feed. Average gains per day of steers and heifers in Corn Belt farmer feedlots based on farm record data were 2.32 pounds and 2.02 pounds, respectively, in both 1976 and 1977. Rates of gain for animals fed in commercial feedlots for these years were 2.93 and 2.85 pounds for steers and 2.43 and 2.49 pounds for heifers in the respective years.

A variety of factors influence rate of gain over time and among regions. Some of the more important factors include weight and condition of cattle entering feedlots, ration composition (faster gains usually result from rations with a high percentage of concentrate), sex of cattle (steers normally gain faster than heifers), and weather conditions (extremely hot, extremely cold, wet, and muddy conditions depress cattle gains).

Gains per day for farmer feedlots were less than for commercial feedlots in 1976 and 1977. This probably was due to lighter cattle placed in farmer feedlots and a much lower concentrate percentage fed in rations. Farmer feedlots had access to lower cost, onfarm produced roughage. This provided them with a less expensive ration, but resulted in lower rates of gain on cattle.

Length of the feeding period is interrelated with rate of gain, weight of animals entering feedlots, ration composition, and market weight. Slow-gaining cattle usually require more time on feed. Feeding periods lengthen with lighter feeder-animal weights. Rations with low levels of concentrate usually produce low rates of gain and, therefore, require a longer feeding period. Days on feed increase as market weight increases, all other things being equal.

The feeding periods for cattle in Corn Belt farmers' feedlots ranged from 160 to 180 days for yearlings to 260 to 270 days for calves during both 1976 and 1977. The weighted average period on feed was 233 days for steers and 219 days for heifers. The average days on feed for cattle in commercial feedlots were 157 and 152 days for steers in 1976 and 1977, respectively. Heifers were fed for an average of 141 and 143 days, respectively. Average length of time on feed during 1976-77 ranged from 138 to 175 days for steers and 104 to 157 days for heifers.

Reasons for large differences in average days on feed between farmer feedlots and commercial feedlots are the same as those that cause differences in rates of gains.

The end product of fed-beef enterprises, Good and Choice grade slaughter cattle, is a function of the many factors discussed above. Prevailing market prices also may influence weights at which slaughter cattle are sold. There is a tendency to feed cattle to heavier weights during times of high prices, while low prices encourage sales of lighter weight fed beef as producers attempt a rapid turnover of inventory and a cut in production costs. Steer weights usually range from 1,000 to 1,200 pounds and heifers from 850 to 1,000 pounds under normal conditions (table 8).

Labor

Large commercial feedlots require a highly specialized labor force. This force may include a yard crew to care for cattle and maintain and operate equipment and facilities; bookkeepers, secretaries, and accountants for office work; highly trained nutritionists and veterinarians; and the management force. Total labor requirements of these personnel are based on hours and wage rates reported by feedlots in the survey, indexed to represent 1976 and 1977 costs. All of the above functions are usually performed by the farmer feedlot operator and the family.

Facilities, Equipment, and Machinery

Facilities and equipment reflect actual usage for fed-beef production in the various regions. Commercial feedlots use facilities and equipment for specialized, individual functions, while farmer feedlot enterprises usually use them for several farming activities. Costs for these items per animal fed are usually lower for commercial feedlots than for farmer feedlots because of more intensive use by the larger feedlots. Rate of cattle turnover in commercial feedlots, for example, averaged from 2 to 2½ times per year in 1976 and 1977, while most farmer feedlots fed just one group of cattle per year, leaving facilities vacant for several months.

The level of use by all sizes of feedlots may vary from year to year, depending on the profitability of fed-beef production, weather conditions, and availability of cattle. Use of commercial feedlot facilities averaged 76 percent of capacity in 1976 and 71 percent in 1977.

Many commercial feedlots, particularly in the Southwest, were much below capacity due to heavy financial losses. Actual use rates were not available for farmer feedlots, so past performance data are relied upon to set use rates from 70 to 80 percent of single-lot capacity for small to large farm lots.

Table 8--Average fed-beef market weights, by region

Region	Steer market weight		Heifer market weight	
	1976	1977	1976	1977
	Pounds			
Corn Belt	1,073	1,073	935	935
Central Plains	1,130	1,126	967	961
Southern Plains	1,085	1,072	840	880
Southwest	1,000	1,030	879	927
Average commercial feedlots	1,090	1,092	907	927

Fixed costs of using facilities, equipment, and machinery are computed on an annual basis. These costs, which include interest, depreciation, taxes, and insurance, occur regardless of the number of cattle fed; therefore, production costs per head increase when facilities are operated at less than capacity. The 1976-77 cost estimates for all of these investment items are valued at replacement cost for computation of depreciation (replacement reserve), insurance, and taxes. Estimated original investments are the basis for interest charges.

Overhead

Farmer feedlots as part of multiple enterprise businesses must pay their share of expenses (such as telephone, organizational membership costs, and farmstead lighting) not associated with any particular enterprise. Total farm overhead costs are estimated and then divided among enterprises; they appear as a separate cost for farmer feedlots. Since commercial feedlots usually are single-enterprise businesses, items normally treated as overhead are included in appropriate expense items.

Management

A management charge for farmer feedlot enterprises is included at a rate of 7 percent of total costs, excluding land costs and purchases of feeder livestock. This charge is in addition to operating labor and represents a return to the operator as a manager comparable to normal fees charged by professional farm managers. Commercial feedlot managers receive a salary paid in cash the same as other labor inputs.

Interest

Interest on operating capital, priced at 1976-77 Production Credit Association rates for each region, is charged for the time each input was employed in fed-beef production. Interest on investment in machinery, equipment, and facilities is charged annually at this same rate, based on original investments.

Land

Land is a minor investment item in fed-beef production. Land occupied by facilities is the only land investment required by commercial feedlots. Farm feedlots are charged with land occupied by the facilities and land required for hay production, since hay is charged on a cost-of-production basis rather than market price. Land interest and taxes are based on market value as estimated by feedlot operators in the 1976 survey. This value is reduced to its average over the last 35 years for established businesses.

Manure Value

Cattle wastes, along with bedding such as straw, have value as fertilizer for crops. Farmer feedlots utilize much of the manure on associated cropland. Commercial feedlots usually sell at least part of the manure produced. In both cases, values accrue to the cattle-feeding enterprise and are treated as a credit in estimating fed-beef cost of production.

Prices

Regional average prices reported by USDA are used to estimate fed-beef budgets. It is assumed that Choice grade prices for feeder cattle represent average quality of cattle for commercial feedlots, while an average of Good and Choice prices depict farmer feedlot conditions. Market prices are for Choice grade fed beef. The prices for 1976 and 1977 production years are presented in table 9.

Table 9--Regional prices for feeder and slaughter cattle

Year and region	Feeder cattle		Slaughter cattle	
	Steers	Heifers	Steers	Heifers
	Dollars per hundredweight			
1976:				
Corn Belt 1/	33.56	28.68	38.62	37.83
Central Plains 2/	39.80	33.66	39.11	37.97
Southern Plains 3/	39.25	32.59	39.56	37.61
Southwest 4/	39.00	32.62	40.61	38.18
1977:				
Corn Belt 1/	36.34	31.36	40.96	38.88
Central Plains 2/	39.95	35.88	40.38	38.96
Southern Plains 3/	38.90	33.83	40.83	38.43
Southwest 4/	39.17	32.63	42.00	39.32

1/ Average of Good and Choice feeder cattle at Kansas City, October and November of preceding year for steer and heifer calves; October to November of preceding year plus March through May of current year for yearlings.

2/ Annual average price of Choice feeder cattle and calves, Colorado-Kansas auctions and slaughter prices at Omaha.

3/ Annual average price of Choice feeder cattle and calves and slaughter cattle, Amarillo market.

4/ Annual average price of Choice feeder cattle and calves and slaughter cattle, California markets.

Source: Livestock, Meat, Wool Market News-Weekly Summary and Statistics, Agr. Mktg. Serv., U.S. Dept. Agr., various issues.

Production Costs

Enterprise budgets are constructed for midwestern farm and western commercial feedlots. The midwestern farm feedlots include all marketings from the nine Midwestern States plus all marketings from the less than 1,000-head capacity feedlots in Kansas, Nebraska, and South Dakota. The western commercial lots include all fed-cattle marketings in the 14 Western States, excluding the farmer feedlots in Kansas, Nebraska, and South Dakota. The individual midwestern farm and western commercial feedlot budgets are weighted by the proportion of total 23-State marketings in determining the total fed-beef cost estimates. The midwestern farm feedlots marketed 34.7 and 33.9 percent of the fed cattle in 1976 and 1977, respectively. Estimates for 1976 and 1977 show the effect of change in prices, physical inputs, and production on fed-beef costs.

Unit costs are presented for per head of fed beef marketed, per 100 pounds of live weight marketed (the breakeven price for slaughter cattle), and per 100 pounds of gain produced in the feedlot. Cost per 100 pounds of gain excludes feeder-cattle purchase expense and gives a measure of economic efficiency of the production process.

National Highlights

Fed-beef production costs were similar for 1976 and 1977; $45.06 and $43.55, respectively, per 100 pounds marketed in the 2 years. These unit costs also are breakeven prices for fed beef; market prices must be at least at these levels for

producers to cover all costs. The national average prices for slaughter steers and heifers in 1976 and 1977 were about $38 and $39, respectively. Fed beef, therefore, was produced at a loss during those years. Conditions improved slightly between 1976 and 1977. Cost per 100 pounds of gain dropped from $56.64 to $52.77 between the 2 years (table 10).

Regional Costs

Significant differences arose in fed-beef costs between midwestern farmer and western commercial feedlots (tables 11-12). Respective total costs per hundredweight marketed were $47.99 and $43.50 in 1976 and $48.99 and $40.76 in 1977. Farmer-feedlot costs were higher than for commercial feedlots in both years, and they increased between 1976 and 1977 while costs for commercial feedlots decreased. Total direct costs were similar in 1977, at $43.32 and $40 for farmer and commercial feedlots, respectively, but major differences occurred in such items as depreciation, interest, taxes, insurance, and management charges. Those items totaled $5.81 and 77 cents per hundredweight marketed for farmer and commercial feedlots, respectively, in 1977. Most farmer feedlots are located where there are wet and cold winters, the time of year when most feeding is done. Facilities usually include cattle shelters, paved or partially paved lots, and enclosed feed storage which make ownership costs per head of capacity high. Only one group of cattle is typically fed per year, so all costs associated with these facilities must be paid by the sale of these animals. Commercial feedlots, located in drier climates with dirt lots and a feedmill, have much lower ownership costs per head of capacity; with more than one group of cattle fed annually, ownership costs are spread over more animals which greatly reduces costs.

Cash and Noncash Costs

Cash and noncash costs cannot be calculated exactly, since the equity position of fed-beef enterprises is not known. Estimates for 1976 and 1977 are made assuming depreciation and interest on investment as noncash costs for all enterprises and family labor and management as noncash costs for farmer feedlots (table 13). About 80 percent of total costs on farmer feedlots are cash expenses. The value is 99 percent for commercial feedlots.

Cash expenses probably approach 100 percent on commercial feedlots in practice, since depreciation reserves are regularly maintained which require a cash withdrawal from the business. Similar cash costs also are incurred by farmer-feedlot businesses, but not usually in the form of a cash reserve. Many farmers purchase depreciable items with borrowed funds which requires regular annual cash outlays for loan repayment. This substitutes for a cash reserve. Part of farm feedlot noncash costs as defined above, therefore, are actually cash outlays which would cause cash costs to be a somewhat higher proportion of total costs than estimated.

Composition of Total Costs

The relative importance of various cost items in fed-beef production are illustrated by data from the feedlot budgets:

	Corn Belt farm feedlots	Commercial feedlots
	Percent	
Feeder-cattle costs	37	54
Feed costs	31	35
Other direct costs	18	9
Total direct costs	86	98
All other costs	14	2
Total costs	100	100

Table 10--Total fed-beef production costs

Item	1976 cost per--			1977 cost per--		
	Head marketed	Hundredweight marketed 1/	Hundredweight of gain 2/	Head marketed	Hundredweight marketed 1/	Hundredweight of gain 2/
			Dollars			
Feed	168.67	16.49	38.79	151.29	14.79	34.42
Other direct costs 3/	55.13	5.39	12.68	55.85	5.46	12.71
Total direct costs except feeder cattle	223.80	21.88	51.47	207.14	20.25	47.13
Feeder cattle	214.60	20.98	--	213.59	20.88	--
Total direct costs	438.40	42.86	51.47	420.73	41.13	47.13
Manure credit	-4.91	-.48	-1.13	-4.81	-.47	-1.09
Total direct costs less manure credit	433.49	42.38	50.34	415.92	40.66	46.04
Total ownership costs 4/	16.47	1.61	3.79	17.80	1.74	4.05
Management 5/	7.57	.74	1.74	7.47	.73	1.70
Taxes and interest on land 6/	3.36	.33	.77	4.30	.42	.98
Total cost	460.89	45.06	56.64	445.49	43.55	52.77

-- = Not applicable.

1/ Total live weight marketed per head.

2/ Total live weight marketed per head minus weight of feeder animals purchased.

3/ Includes veterinary and medicine, contract hauling, marketing, utilities, bedding, legal fees, fuels, lubricants, repairs, labor, interest on operating capital, and miscellaneous costs.

4/ Includes replacement reserve, interest, taxes, and insurance.

5/ Management charge is a cash expense for commercial feedlots and valued at 7 percent of total cost minus land charges and purchased livestock for farm feedlots.

6/ Land is valued at 1976 and 1977 market prices for those respective years.

Table 11--Fed-beef production costs, midwestern farmer feedlots

Item	1976 cost per--			1977 cost per--		
	Head marketed	Hundredweight marketed 1/	Hundredweight of gain 2/	Head marketed	Hundredweight marketed 1/	Hundredweight of gain 2/
	Dollars					
Feed and pasture	172.25	16.71	33.82	160.50	15.56	31.51
Veterinary and medicine	3.81	.37	.75	4.33	.42	.87
Bedding	6.80	.66	1.34	7.42	.72	1.46
Livestock hauling and marketing 3/	15.36	1.49	3.02	15.57	1.51	3.06
Fuel, lubricant, and electricity	6.70	.65	1.32	7.63	.74	1.50
Machinery, equipment, and facility repair	12.06	1.17	2.37	13.19	1.28	2.59
Labor	24.12	2.34	4.74	25.77	2.50	5.06
Interest on operating capital 4/	10.51	1.02	2.06	10.20	.99	2.00
General farm overhead	11.96	1.16	2.35	12.37	1.20	2.43
Total direct costs except feeder cattle	263.57	25.57	51.77	256.98	24.92	50.48
Feeder cattle	178.33	17.30	--	189.77	18.40	--
Total direct costs	441.90	42.87	51.77	446.75	43.32	50.48
Manure credit	-12.98	-1.25	-2.54	-12.59	-1.22	-2.47
Total direct costs less manure credit	429.01	41.62	49.23	434.16	42.10	48.01
Machinery RITI 5/	12.68	1.23	2.49	13.50	1.32	2.65
Equipment and facilities RITI 5/	24.43	2.37	4.80	26.39	2.56	5.18
Total ownership costs	37.11	3.60	7.29	39.89	3.88	7.83
Management 6/	20.20	1.96	3.97	19.89	1.93	3.91
Taxes and interest on land 7/	8.35	.81	1.64	11.13	1.08	2.19
Total cost	494.67	47.99	62.13	505.07	48.99	61.94

-- = Not applicable. 1/ Total weight of fed beef marketed. 2/ Total weight of fed beef marketed minus total weight of feeder animals purchased. 3/ Does not include owned vehicles. 4/ Interest is on money for all direct costs for the time it is in use. 5/ Replacement reserve, interest, taxes, and insurance. 6/ Valued at 7 percent of total cost minus land charge on purchased livestock. 7/ Land is valued at 1976 market price and includes only land used for facilities and pasture.

Table 12--Fed-beef production costs, western commercial feedlots

Item	1976 cost per--			1977 cost per--		
	Head marketed	Hundredweight marketed 1/	Hundredweight of gain 2/	Head marketed	Hundredweight marketed 1/	Hundredweight of gain 2/
			Dollars			
Feed	166.71	16.37	42.28	148.75	14.40	36.42
Veterinary and medicine	7.27	.72	1.85	7.54	.73	1.85
Machinery hire 3/	1.17	.11	.29	1.24	.12	.30
Livestock, manure, and feed hauling 4/	1.39	.14	.37	1.45	.14	.36
Marketing	1.11	.11	.28	1.14	.11	.28
Utilities 5/	4.38	.43	1.10	4.55	.44	1.11
Legal fees	1.69	.17	.43	1.76	.17	.43
Fuels and lubricants	1.36	.13	.35	1.76	.17	.43
Machinery, equipment, and facility repair	1.51	.15	.39	2.07	.20	.51
Labor 6/	4.57	.45	1.16	4.93	.48	1.21
Interest on operating capital 7/	9.38	.93	2.46	6.92	.67	1.69
Miscellaneous	2.13	.21	.54	2.17	.21	.53
Total direct costs except feeder cattle	202.67	19.92	51.50	184.28	17.84	45.12
Feeder cattle	233.96	22.94	--	228.91	22.16	--
Total direct costs	436.63	42.86	51.50	413.19	40.00	45.12
Manure credit	-.81	-.08	-.21	-.83	-.08	-.20
Total direct costs less manure credit	435.82	42.78	51.29	412.36	39.92	44.92
Machinery RITI 8/	2.64	.26	.68	3.41	.33	.83
Equipment and facilities RITI 8/	2.91	.29	.74	3.30	.32	.81
Total ownership costs	5.55	.55	1.42	6.71	.65	1.64
Management 9/	1.03	.10	.26	1.24	.12	.30
Taxes and interest on land 10/	.67	.07	.17	.72	.07	.18
Total cost	443.07	43.50	53.14	421.04	40.76	47.04

-- = Not applicable.

1/ Total weight of fed beef marketed. 2/ Total weight of fed beef marketed minus total weight of feeder animals purchased. 3/ Value of all machine work hired except trucking. 4/ Does not include owned vehicles. 5/ Includes electricity, natural gas, and telephone. 6/ Value of all labor at wage rates reported by fed-beef businesses, but does not include manager's salary. 7/ Interest is charged on money for all direct costs for the time it is in use. 8/ Replacement reserve, interest, taxes, and insurance. 9/ Management charge is that actually paid by fed-beef business. 10/ Land is valued at 1976 market price and includes only land occupied by feedlot facilities.

Table 13--Cash and noncash costs in fed-beef production, midwestern farmer and western commercial feedlots

Item	1976						1977					
	Farm feedlots			Commercial feedlots			Farm feedlots			Commercial feedlots		
	Cash	Non-cash	Total	Cash	Non-cash	Total	Cash	Non-cash	Total	Cash	Non-cash	Total
	Dollars per hundredweight marketed											
Total direct costs less manure credit 1/	39.28	2.34	41.62	42.78	0	42.78	38.84	3.26	42.10	39.92	0	39.92
Ownership costs 2/	.22	3.38	3.60	.04	.51	.55	.24	3.64	3.88	.05	.60	.65
Management 3/	0	1.96	1.96	.10	0	.10	0	1.93	1.93	.12	0	.12
Taxes and interest on land 4/	.06	.75	.81	.01	.06	.07	.06	1.02	1.08	.01	.06	.07
Total costs	39.56	8.43	47.99	42.93	.57	43.50	39.14	9.85	48.99	40.10	.66	40.76

1/ The value of operator and family labor is treated as a noncash cost for farm feedlots.

2/ Includes replacement reserve, interest on investment, taxes, and insurance. Replacement reserve and interest are assumed to be noncash costs.

3/ Management on farm feedlots is assumed to be a noncash cost; on commercial feedlots, it is a cash expense usually paid as a salary.

4/ Taxes are a cash cost, while interest is treated as a noncash cost.

Direct costs, which include all items that vary with level of fed-beef production, comprise most enterprise costs. Largest direct costs in 1977 were expenditures for feeder cattle and feed which together accounted for 89 percent and 68 percent of total costs, respectively, for commercial and farmer feedlots. Other direct costs, such as transportation, marketing, gas, oil, repairs, and labor, were much smaller for commercial feedlots than for farmer feedlots. This difference was due primarily to economies in the use of inputs. A similar situation occurred with depreciation, interest on investment, taxes, and insurance which are fixed and continue even if feedlots remain empty. Costs per unit of production are much smaller for large commercial lots that have high rates of cattle turnover and feed cattle year around than for small farm feedlots that may feed only one group of cattle per year.

STRUCTURAL CHARACTERISTICS

The setting within which fed-beef production occurs affects producer and industry response to changes in factors such as feeder-cattle supplies, feed costs, and livestock prices at farm and retail levels. Important characteristics of feedlot operations include business organization, horizontal and vertical integration, custom feeding, type of facilities, cattle purchasing and marketing channels, and feed sources. The following description of these characteristics is representative of fed-beef businesses in 1975 and comes from the special USDA survey taken in 1976.

Characteristics of Commercial Cattle-Feeding Businesses

Analyses of commercial fed-beef businesses (1,000-head or more capacity) are made by size and for selected production regions. Size comparisons are based on a random sample of commercial feedlots from all 23 major cattle-feeding States.

Regional comparisons are for only three major western commercial cattle-feeding regions (fig. 1). Combined fed-beef production from these regions is about 88 percent of marketings from all commercial feedlots in the United States. The Central Plains region has the most marketings, with nearly two-fifths of the U.S. total. The Southern Plains and the Southwest produce about three-tenths and one-fifth, respectively, of total marketings from large feedlots.

Business Organization

Most commercial feedlot businesses are either single ownerships, corporations, or partnerships (table 14). Variations in legal structure occur among commercial feedlots of different sizes. Nearly one-half of feedlots with a capacity of 1,000 to 1,999 head are single-owner businesses. The proportion drops as size increases. Full partnerships follow a similar pattern, becoming less common as size of business increases. Corporate structures occur more frequently as size increases: 28 percent of small feedlots (1,000 to 1,999 head) compared with 75 percent of large feedlots (32,000 head and over).

Corporations are more common among larger feedlots because they facilitate accumulation of the large quantities of investment capital needed by these businesses and limit personal liability to the amount of investment in the business. There are some differences in ownership among regions (table 15). Single-owner businesses, for example, are found more frequently in the Central Plains, while full partnerships are most common in the Southern Plains.

Table 14--Ownership of commercial cattle-feeding businesses, by size of feedlot, 1975

Form of ownership	Feedlot capacity (head)						
	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over	All sizes
	Percent						
Single owner	47	44	20	17	7	0	33
Partnership:							
Full	23	16	10	13	7	0	16
Limited	2	5	13	4	0	0	5
Corporation: 1/							
Standard family	15	15	34	12	7	0	17
Standard nonfamily	3	5	10	29	50	50	13
Subchapter "S" family	10	10	3	8	0	25	8
Subchapter "S" nonfamily	0	5	10	13	15	0	4
All others	0	0	0	4	14	25	4
Total	100	100	100	100	100	100	100

1/ A subchapter "S" family corporation is one owned and controlled by a group of 10 or fewer stockholders related by blood or marriage, filing Federal income tax form 1120-S. A subchapter "S" nonfamily corporation is one of the same type, but the members are not necessarily related.

Source: 1976 USDA survey of feedlots.

Horizontal and Vertical Integration 2/

Horizontal integration, or the ownership of multiple feedlots, is common in cattle-feeding, particularly among larger feedlots. The number of feedlots owned by horizontally integrated businesses varies. Sixty-two percent of the businesses had two feedlots in 1975, while 19 percent had more than six feedlots. The combined feeding capacity of some businesses exceeded 200,000 head. Ownership of multiple feedlots was most common in the Southwest where 23 percent of the businesses were involved with more than one feedlot.

Vertical integration as defined in this report is the ownership of more than one of the functions involved in moving feeder cattle to the consumer as fed beef. This definition excludes the production of feeder cattle as one of the functions, treating feeder cattle as the initial raw product to be processed.

Vertically integrated feedlot businesses also are closely associated with size of operation. Larger feedlots practice vertical integration most frequently. Regional differences also exist. The Southwest had much more vertical integration, primarily

2/ It was impossible to determine whether multiple feedlots and/or vertically integrated firms were located together. Firms in several States were involved in some instances.

Table 15--Ownership of commercial cattle-feeding business, by region, 1975

Form of ownership	Central Plains	Southern Plains	Southwest
		Percent	
Single owner	32	13	5
Partnership:			
Full	10	30	9
Limited	5	0	9
Corporation:			
Standard family	15	2	38
Standard nonfamily	24	23	14
Subchapter "S" family	5	11	10
Subchapter "S" nonfamily	3	21	5
All others	6	0	10
Total	100	100	100

Source: 1976 USDA survey of feedlots.

in the smaller capacity groups, among fed-beef businesses (38 percent) than did the Southern and Central Plains (18 and 5 percent, respectively). The proportion of all western commercial feedlots with vertical integration was 13 percent. Functions most frequently integrated with fed-beef production were feed processing and slaughtering; only a few cattle-feeding businesses actually sold retail beef.

Most vertically integrated feedlots also were horizontally integrated. This probably was because they possessed sufficient financing and a quality of management that made these extensions of their businesses feasible.

Some fed-beef operations also produced feeder cattle, although this activity was not extensive. In most cases, ownership of a beef-breeding herd probably was not motivated by the objective of producing a substantial portion of the total cattle fed. Only 4 percent of fed beef marketed by these businesses was produced from their own herd. Capital formation to produce any significant portion of placements would be extremely difficult.

Custom Feeding

Feeding cattle on a custom basis was common among large commercial feedlots in 1975 (table 16). Reasons for this practice included reducing risk associated with cattle feeding amd minimizing capital requirements of the business. The profit margin per animal in fed-beef production is small and may become negative if weather, feeder-cattle prices, feed costs, or fed-beef prices change in an unfavorable direction. Movements in these factors are not always predictable, thus creating much of the risk in this business.

Operating capital requirements are large in commercial cattle feeding. A 22,000-head-capacity feedlot spends $15 to $20 million a year, with over four-fifths of this

Table 16--Custom cattle feeding of commercial feedlots, by feedlot capacity and region, 1975

Feedlot capacity (head) and region	Custom-fed cattle as a proportion of total marketings	Operations that custom feed cattle: Feedlots custom feeding cattle	Operations that custom feed cattle: Total marketings custom fed
		Percent	
Feedlot capacity:			
1,000-1,999	1	5	28
2,000-3,999	9	18	63
4,000-7,999	33	53	65
8,000-15,999	54	79	74
16,000-31,999	70	100	92
32,000 and over	50	75	83
All sizes	46	36	73
Region:			
Central Plains	37	38	76
Southern Plains	71	85	80
Southwest	58	62	70

Source: 1976 USDA survey of feedlots.

for feed and feeder-cattle purchases. Custom-feeding cattle for others greatly reduces this capital requirement and shifts much of the risk to the customers. Larger feedlots practice this much more frequently than smaller feedlots.

Custom feeding is done in all three of the major regions. Its greatest use is in the Southern Plains where 71 percent of 1975 marketings were custom fed (table 16).

There are some risks associated with custom feeding, the largest of which is attracting enough customers to keep feedlots filled. Customers usually are feeder-cattle producers or investors from outside of agriculture. When losses on cattle being fed occur over an extended time period, customers stop placing cattle in feedlots. Custom feedlots can get into financial difficulty if they have insufficient income to cover fixed costs and certain operating expenses paid in advance. This happened in late 1973 and in 1974. Feedlot customers had heavy losses causing them to discontinue this activity. Many custom feedlots were either empty or operated far below capacity in 1974-75.

Cattle-Feeding Facilities

Commercial feedlot facilities are similar throughout the country. The general layout includes an open lot for pens; each pen may have room for 100 to 500 feeder cattle. Pens are of dirt, sometimes mounded in the center with a concrete apron along the feedbunks and around watering troughs. Fences are poles or cable. A feedmill to process grains and other concentrates usually is part of the facilities. Feed is mixed and transported to the feedbunks by trucks mounted with specially designed feedboxes for mixing and distributing feed. Bunker or trench silos hold corn silage and other roughages. Grain also may be stored in silos, but is more often stored in steel bins above ground.

A feedmill usually requires the largest investment among feedlot facilities. The principal feeds requiring processing are grains--about 62 percent of all feed consumed in commercial feedlots. Methods of grain processing vary among feedlots, depending primarily on personal preferences of owners.

Good feed conversion is possible from feeding whole corn where cattle are on high corn rations. Feedlots following this practice usually have limited milling facilities. Rolling, the most common method, is used extensively by feedlots of all sizes (53 percent of the feedlots use this method). Grinding is more common among smaller feedlots, although some of the largest businesses also use it when their ration is based on high-moisture corn (25 percent of all feedlots use grinding). Flaking is used mostly by larger feedlots, due to the high investment required (12 percent of all feedlots use flaking).

Seasonality of Production

Commercial feedlot businesses usually keep their pens full of cattle the entire year unless weather conditions, feeder-cattle supplies, or heavy financial losses make reductions necessary. Long periods of wet weather cause pens in open lots to become extremely muddy, which can reduce weight gains of cattle. When this occurs, pens must be vacated until they become dry. This frequently causes some unused capacity during winter and spring months. Shortages of feeder cattle may cause feedlots to operate at less than capacity in spring and summer. Periods of financial losses such as those experienced in 1974 and 1975 can cause large reductions in numbers of cattle fed.

Purchase and Market Channels

Avenues for purchasing feeder cattle as defined in this study are auctions, order buyers, dealers, and others.

Auctions may also be called sale barns or community auctions. Livestock auctions receive livestock and sell to buyers on an auction basis, with bidding and selling open to the public. The auctions may be owned privately by individuals, partnerships, corporations, or cooperative associations.

Order buyers act as agents of livestock buyers in procuring livestock. They most commonly buy through terminal markets, auctions, dealers, or local markets. They also occasionally act as agents of the buyer to purchase livestock directly from farmers. Order buyers do not take title to livestock, but perform the buying service for clients for a fee.

Dealers are independent buyers that purchase cattle, hold the animals for a short time, and resell them for a profit. Other channels include all other sources by which animals are obtained for the feedlot. This is mostly direct purchases from producers by feedlot personnel.

Most feeder cattle were purchased through auctions by feedlot personnel or through order buyers during 1975. There were some differences in purchasing channels by size of feedlot (table 17). A decrease in the proportion of feeder cattle purchased by feedlot personnel through auctions occurred as size increased; 47 percent for small feedlots (1,000- to 1,999-head capacity), compared with 15 percent for extremely large feedlots (32,000-head and over capacity). Larger feedlots relied heavily upon order buyers and to a lesser extent upon dealers. (This is to be expected, since their geographical area for purchasing may include several States or the entire United States.) Auctions were most frequently used in the Central Plains, while order buyers accounted for most purchases in the other regions.

Table 17--Feeder-cattle purchasing channels, commercial cattle feedlots, by size of feedlot and region, 1975

Feedlot capacity (head) and region	Feeder cattle purchasing channels: Auctions	Order buyers	Dealers	Other 1/	All purchasing channels
	Percentage of feedlots reporting purchases				
Feedlot capacity:					
1,000-1,999	68	55	7	27	--
2,000-3,999	67	61	15	38	--
4,000-7,999	60	63	13	40	--
8,000-15,999	54	75	4	50	--
16,000-31,999	43	79	43	57	--
32,000 and over	50	75	25	50	--
All sizes	62	63	13	38	--
Region:					
Central Plains	70	59	5	36	--
Southern Plains	50	69	18	38	--
Southwest	33	81	38	33	--
	Percentage of feeder cattle purchased by all feedlots				
Feedlot capacity:					
1,000-1,999	47	36	3	14	100
2,000-3,999	44	38	4	14	100
4,000-7,999	35	43	4	18	100
8,000-15,999	28	47	1	24	100
16,000-31,999	22	41	21	16	100
32,000 and over	15	59	12	14	100
All sizes	39	40	5	16	100
Region:					
Central Plains	48	37	1	14	100
Southern Plains	27	53	9	11	100
Southwest	14	58	15	13	100

-- = Not applicable.

1/ Mainly direct purchases from feeder-cattle producers.

Source: 1976 USDA survey of feedlots.

Contract purchasing of feeder cattle, which is usually done through either order buyers or feedlot personnel, is not common. Only 12 percent of the feedlots used this practice (table 18). Feeding businesses in the Southwest made greater use of this practice than those in the other regions.

Fed-beef marketing from commercial feedlots generally was direct to packing plants. Packer buyers dealt directly with the feedlots. Some sales may have been made through auctions, but no survey data were collected on this practice. Reports indicate, however, that about 89 percent of steers and heifers were direct purchases by packers in 1976, while 7 percent moved through terminal markets, and 3 percent were through auctions. 3/ Eight percent of the commercial feedlots reported marketing fed

3/ Data reported in "Packers and Stockyards Resume," Packers and Stockyards Administration, U.S. Dept. Agr., Dec. 23, 1977.

Table 18--Contract purchasing of feeder cattle, commercial cattle feedlots, by size of feedlot and region, 1975

Size of feedlot (head) and region	Feedlots	Feeder cattle purchased by feedlots reporting	Total feeder cattle purchased by commercial feedlots
		Percent	
Feedlot capacity:			
1,000-1,999	12	64	7
2,000-3,999	8	28	2
4,000-7,999	7	52	3
8,000-15,999	12	52	6
16,000-31,999	43	55	24
32,000 and over	0	0	0
All sizes	12	53	7
Region:			
Central Plains	9	18	2
Southern Plains	16	57	9
Southwest	24	56	13

Source: 1976 USDA survey of feedlots.

beef under contract (table 19). These feedlots had 49 percent of all fed cattle marketed, but only 4 percent of their cattle were marketed under contract.

Feed Sources

Commercial fed-beef businesses use large quantities of feed. A 26,000-head feedlot may feed more than 36 million pounds of corn silage and more than 128 million pounds of corn as grain in a year. Only a small proportion of this is produced on land owned by the business; most feed is purchased. Roughages such as silage and hay usually are acquired from farmers in the immediate area to minimize transportation costs. Grains may be shipped in from great distances if local supplies are limited.

Characteristics of Farmer Cattle-Feeding Businesses

Data on farmer fed-beef businesses (less than 1,000-head capacity) are from farms with more than 40 head of fed-beef sales in the Midwestern States (Corn Belt, fig. 1). Farms with cattle-feeding enterprises of this size in the eastern edges of Kansas, Nebraska, and South Dakota are included in the survey area. Northern areas of Wisconsin, Minnesota, and Michigan are excluded. The included farms accounted for about four-fifths of all farmer cattle-feeding businesses and nine-tenths of total fed-beef marketings from businesses of this size in the United States in 1975.

Business Organization

Most farms with cattle-feeding enterprises were owned by individual producers in 1975 (table 20). Partnerships and corporations were found occasionally. There were differences in ownership patterns as size of feeding operation increased, with a shift from single-owner businesses to partnerships. There also was some tendency for more family corporations as feeding businesses got larger.

Table 19--Contract marketing of fed beef, commercial cattle feedlots, by size of feedlot and region, 1975

Size of feedlot (head) and region	Feedlots	Fed beef marketed by feedlots reporting	Total fed beef marketed by commercial feedlots
		Percent	
Feedlot capacity:			
1,000-1,999	5	34	2
2,000-3,999	8	32	2
4,000-7,999	10	68	7
8,000-15,999	8	63	5
16,000-31,999	14	52	7
32,000 and over	0	0	0
All sizes			
Region:			
Central Plains	5	26	1
Southern Plains	27	35	9
Southwest	14	91	4

Source: 1976 USDA survey of feedlots.

Table 20--Ownership of farmer feedlots, 1975

Form of ownership	Feedlot capacity (head)				
	Less than: 100	100-199	200-499	500-999	All sizes
		Percent			
Single owner	81	82	75	44	77
Partnership:					
Full	17	8	15	56	13
Limited	2	9	2	0	6
Family corporation	0	1	8	0	4
Total	100	100	100	100	100

Source: 1976 USDA survey of feedlots.

Seasonality of Production

Cattle feeding in the Midwestern and Eastern States tends to be seasonal in nature. Feed crops, harvested in the fall, signal the time for increased feeder-cattle placements in feedlots. Many farmers feed only a single group of cattle during the year. Others buy and sell on a more continuous basis. The relative importance of the two programs cannot be determined from available data. The combined effect of

the programs upon cattle placements are indicated below. Data are for all feedlots in the region, including some over 1,000 head in size.

	Feeder-cattle placements	Fed-beef marketings
	Percentage of four-quarter average	
October-December	168	93
January-March	78	97
April-June	71	102
July-September	83	108

The above data also indicate a seasonal distribution of marketings. Marketings are heaviest in summer, but there is much less seasonal fluctuation than in placements. This is explained partly by the wide range in weight of cattle placed on feed in the late fall which results in a continual flow of cattle to market throughout the year as the cattle reach slaughter weights. Farmers who buy and sell several times during the year also help equalize marketings among quarters.

Market Channels

A variety of avenues are used for marketing fed beef by midwestern and eastern producers (table 21). Direct sales to packing plants were most common in 1975, followed by commission firms, auctions, and order buyers. Some producers used more than one marketing method. Some differences in marketing occurred by size of business. Direct sales were made more frequently as head marketed increased. Order buyers and commission firms received more business from farms with fewer marketings than from larger cattle-feeding enterprises. Auctions attracted 15 to 24 percent of producers, with no trends in use by size of business.

Steers and heifers marketed through various channels were 64 percent by direct sales, 24 percent through terminal markets, and 12 percent by auctions. 4/

Cattle-Feeding Facilities

Cattle-feeding facilities varied in 1975 from unpaved, wood-fenced corrals to expensive paved lots, semi- or total-confinement sheds, and airtight feed-storage facilities (table 21). Shelters for cattle most commonly were used by small feeding enterprises. Only 34 percent of the larger feeding businesses (500 to 999 head) had this item. Unpaved lots also were associated with the larger businesses, although some had both paved and unpaved pens. Most feeds were processed on the farm and distributed to feedbunks with tractor-powered equipment.

Source of Feeds

Rations for producing fed beef on farmer feedlots are built around home-grown feeds. Maximum use is made of roughages during the growing period and on many farms during the fattening period. Hay and silage make up 20 to 60 percent of the total ration. The region produced 91 and 99 percent of these feeds, respectively, on the farm in 1975. There was little deviation from this among sizes of business. Grain, the other major ration component, usually was corn, and 85 percent was produced on the

4/ Data reported in "Packers and Stockyards Resume," Packers and Stockyards Administration, U.S. Dept. Agr., Dec. 23, 1977.

Table 21--Selected characteristics of farmer feedlot enterprises, by size of feedlot, 1975

Item	Feedlot capacity (head)				
	Less than 100	100-199	200-499	500-999	All sizes
	Percent				
Onfarm produced feeds:					
Grains	98	96	89	58	85
Hay	99	81	94	100	91
Silage	100	99	100	100	99
Marketing channels:					
Auction	17	18	24	15	20
Order buyer	29	11	10	10	14
Commission firm	32	43	40	15	38
Direct sale	42	53	55	76	53
Other			8	5	5
Cattle-feeding facilities:					
Cattle shelter	91	90	94	34	90
Grain and concentrate storage	96	78	82	95	84
Paved lots	66	79	93	90	82
Unpaved lots	54	87	88	24	79
Manure handling and storage	53	65	56	90	61
Gross agricultural income:					
Corn	23	16	10	3	12
Soybeans	25	15	8	12	13
Other crops	8	3	2	2	3
Hogs 1/	18	23	28	10	22
Fed beef 1/	26	39	48	73	46
Other livestock 1/	0	4	4	0	4
Total	100	100	100	100	100

1/ Cost of purchased feeder animals is deducted from gross sales for these items.

Source: 1976 USDA survey of feedlots.

farm. The proportion of grain purchased increased with size of feeding enterprise, ranging from 2 percent up to 42 percent between small and large operations. As much as 95 percent of the total ration fed on some farms was homegrown; high protein supplements were the only purchased feeds.

Importance of Fed-Beef Production to Farm Income

Cattle feeding is usually only one of several production activities on farms in the Midwestern and Eastern States that have this enterprise (table 21). Fed-beef sales in 1975 averaged 47 percent of gross income for such farms. The importance of other commodity sales decreased as marketings of fed beef increased. Farms with marketings of less than 100 fed beef derived only 26 percent of gross income from cattle sales, while those that marketed over 500 head obtained 74 percent of gross income from cattle sales.

Some year-to-year changes in these percentages can be expected due to fluctuations in prices, crop acreage, and livestock inventories.

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